USB2860

User’s Manual

Beijing ART Technology Development Co., Ltd.

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Chapter 1 Overview

In the fields of Real-time Signal Processing, Digital Image Processing and others, high-speed and high-precision data acquisition modules are demanded. ART USB2860 data acquisition module, which brings in advantages of similar products that produced in china and other countries, is convenient for use, high cost and stable performance.

ART USB2860 is a data acquisition module based on USB bus. It can be directly inserted into USB interface to constitute the laboratory, product quality testing center and systems for different areas of data acquisition, waveform analysis and processing. It may also constitute the monitoring system for industrial production process.

Unpacking Checklist

Check the shipping carton for any damage. If the shipping carton and contents are damaged, notify the local dealer or sales for a replacement. Retain the shipping carton and packing material for inspection by the dealer.
Check for the following items in the package. If there are any missing items, contact your local dealer or sales.

- USB2860 Data Acquisition Board
- ART Disk
  a) user's manual (pdf)
  b) drive
  c) catalog
- Warranty Card

FEATURES

Analog Input

- Input Range: ±10V, ±5V, 0～20V, 0～10V
- 12-bit resolution
- Sampling Rate: A/D chip conversion frequency 100KS/s
- Analog Input Mode: 32SE/1DI
- Analog Input Resistance: 100MΩ
- Analog Input Common Mode Voltage:> ± 2V
- Amplifier Settling Time: 2us
- Amplifier Gain Error: 0.05%
- Nonlinear Error: ± 1LSB (max)
- System Measurement Accuracy: 0.01%
- Isolation Voltage: $1000V_{AC}$
- Operating Temperature Range: 0℃～55℃
- Storage Temperature Range: -20℃～70℃

Digital Input

- Latch: 74LS245
- Channel No.: 16-channel
- Electric Standard: TTL compatible

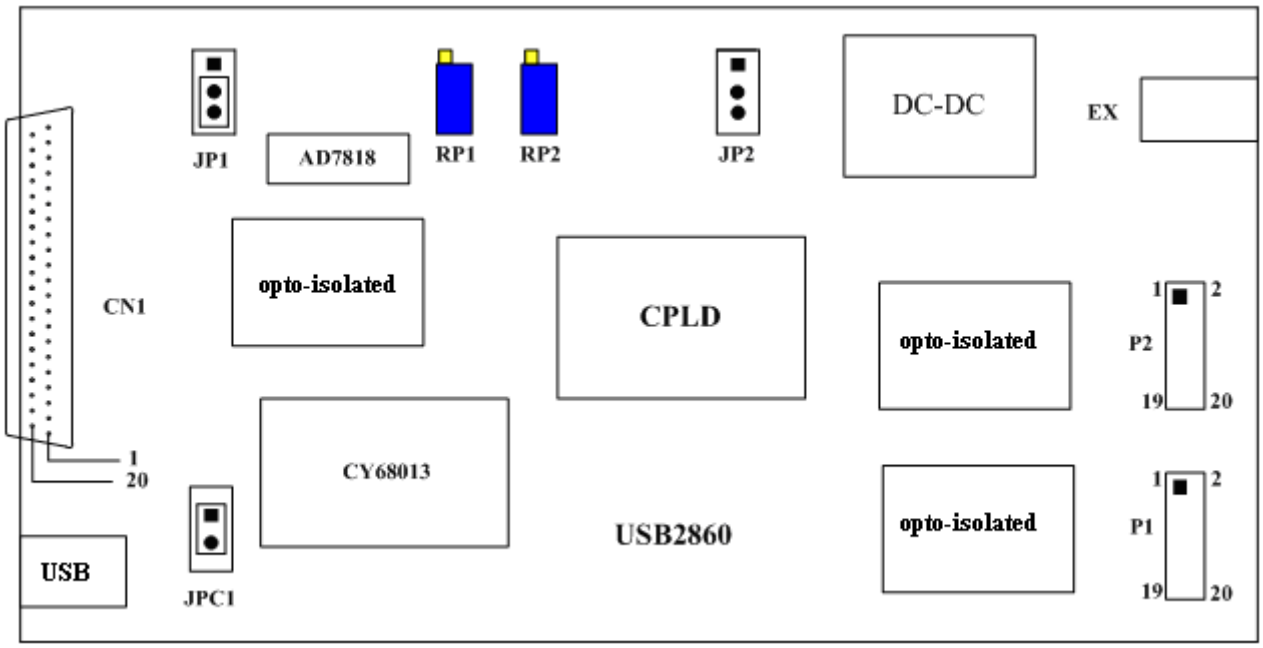
- Maximum Absorption Current:<0.5mA
- High Voltage: ≧2.0V
- Low Voltage: ≦0.8V
- Optcoupler Isolation

Digital Output

- Drive: 74LS573
- Channel No.: 16-channel
- Electrical Standard: TTL compatible
- Maximum Pull-down Current: 20mA
- Maximum Pull-up Current: 2.6mA
- High Voltage: ≧3.4V
- Low Voltage: ≦0.5V
- Optcoupler Isolation

Chapter 2 Components Layout Diagram and a Brief Description

2.1 The Main Component Layout Diagram



2.2 The Function Description for the Main Component

2.2.1 Signal Input and Output Connectors

CN1: analog signal input connector
P1: digital signal input connector
P2: digital signal output connector

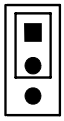
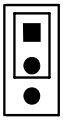
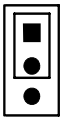
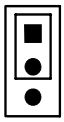
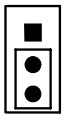
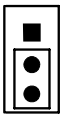
2.2.2 Potentiometer

RP1: amplifier fine-tuning potentiometer
RP2~RP5: amplifier flat tuning potentiometer

2.2.3 Jumper

JP1 and JP2 is used to set analog input range

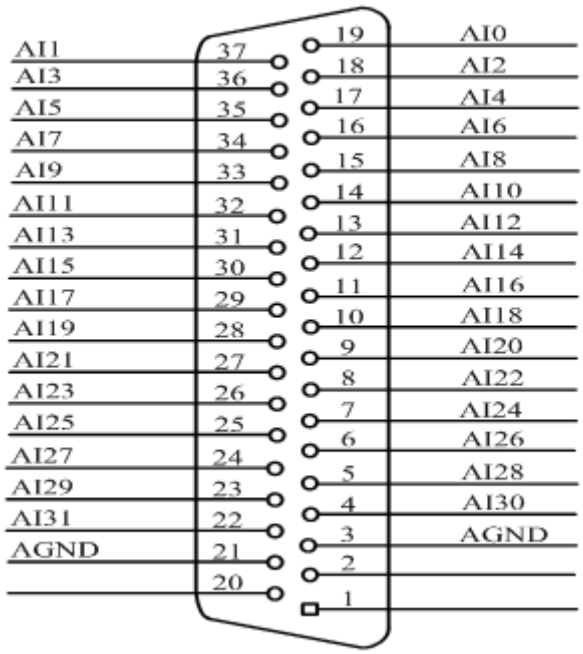
Analog input range selection

Range	JP1	JP2
-10V~+10V		
-5V~+5V		
0V~20V		
0V~10V		

Chapter 3 Signal Connectors

3.1 The Definition of Signal Input and Output Connectors

37 core plug on the CN1 pin definition

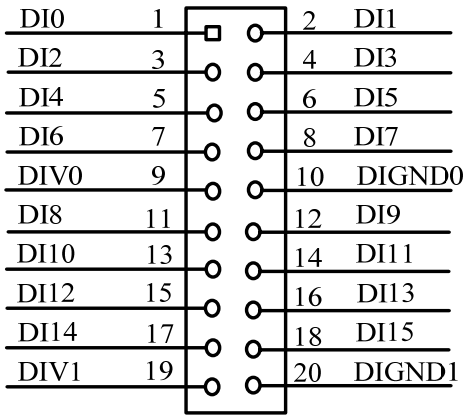


Pin definition about AD:

Pin name	Type	Pin function definition
AI0～AI31	Input	Analog input, reference ground is AGND.
AGND	GND	Analog ground. This AGND pin should be connected to the system's AGND plane.
NC		No connection

Pin definition about Digital Input

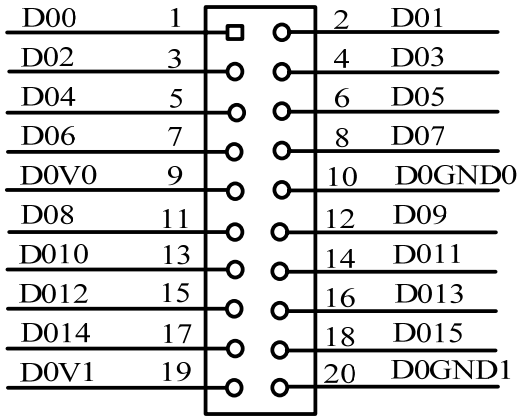
Because the card with isolation, so the two 8-bit DI power and ground are isolated, respectively DIV0, DIGND0 and DIV1, DIGND1.



Pin Name	Feature	Function Definition
DI0~DI15	Input	Digital signal input.
DIVO, DIV1	Power	Digital input power
DIND0, DIND1	GND	Digital ground.

Pin definition about Digital Output

Because the card with isolation, so the two 8-bit DI power and ground are isolated, respectively DOV0, DOGND0 and DOV1, DOGND1.



Pin Name	Feature	Function Definition
DO0~DO15	Output	Digital signal output.
DIVO, DIV1	Power	Digital output power.
DOND0, DOND1	GND	Digital ground.

Chapter 4 Connection Ways for Each Signal

4.1 AD Single-ended Input Connection

Single-ended mode can achieve a signal input by one channel, and several signals use the common reference ground. This mode is widely applied in occasions of the small interference and relatively many channels.

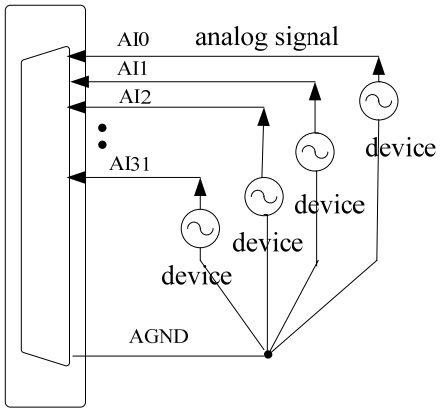


Figure 4.1 single-ended input connection

4.2 AD Double-ended Input Mode

Double-ended input mode, which was also called differential input mode, uses positive and negative channels to input a signal. This mode is mostly used when biggish interference happens and the channel numbers are few. Single-ended/double-ended mode can be set by the software, please refer to USB2860 software manual.

According to the diagram below, USB2860 board can be connected as analog voltage double-ended input mode, which can effectively suppress common-mode interference signal to improve the accuracy of acquisition. Positive side of the 16-channel analog input signal is connected to AI0~AI15, the negative side of the analog input signal is connected to AI16-~AI31, equipments in industrial sites share the AGND with USB2860 board.

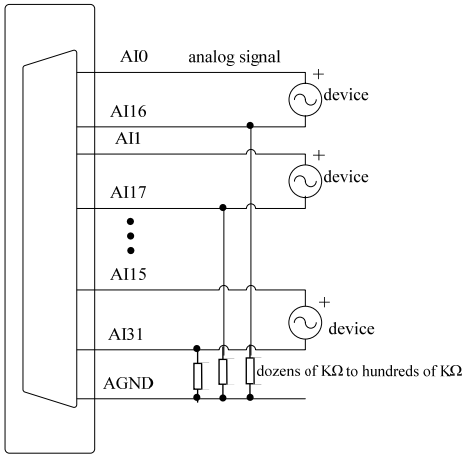


Figure 4.2 double-ended input connection

4.3 Other Connections

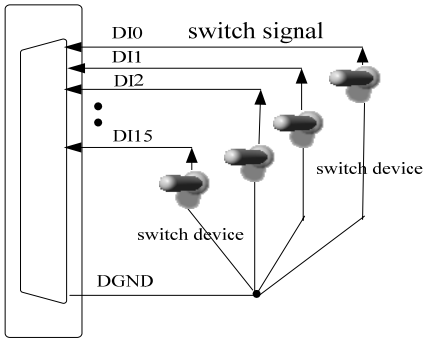


Figure 4.3 digital signal input connection

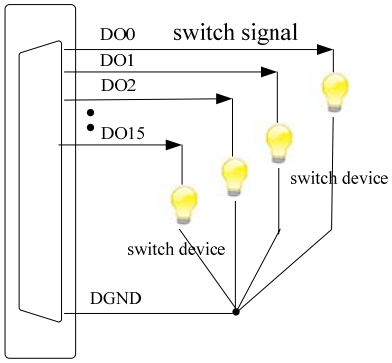


Figure 4.4 digital signal output connection

Chapter5 Notes, Calibration and Warranty Policy

5.1 Notes

In our products' packing, user can find a user manual, a USB2860 module and a quality guarantee card. Users must keep quality guarantee card carefully, if the products have some problems and need repairing, please send products together with quality guarantee card to ART, we will provide good after-sale service and solve the problem as quickly as we can.

When using USB2860, in order to prevent the IC (chip) from electrostatic harm, please do not touch IC (chip) in the front panel of USB2860 module.

5.2 Analog Signal Input Calibration

Every device has to be calibrated before sending from the factory. It is necessary to calibrate the module again if users want to after using for a period of time or changing the input range. USB2860 default input range: ±10V, in the manual, we introduce how to calibrate USB2860 in ±5V, calibrations of other input ranges are similar.

Prepare a digital voltage instrument which the resolution is more than 5.5 bit, install the USB2860 module, and then power on, warm-up for fifteen minutes.

1) Full-scale adjustment: take the channel AI0 and AI1 for example, connect 4999.39mV to AI1 and connect 0.00mV to AI0, then run ART Data Acquisition Measurement Suite in the WINDOWS and select 1-channel (only 1-channel working). Adjust potentiometer RP1 and RP2 in order to make the 7-pin of N7（TL064）to output 4999.39mV. Full-scale adjustment of other channels is alike.
2) Zero-point adjustment: take the channel AI0 and AI1 for example, connect 4999.39mV to AI1 and connect 0.00mV to AI0, then run ART Data Acquisition Measurement Suite in the WINDOWS and select 0-channel (only 0-channel working). Adjust potentiometer RP1 and RP2 in order to make the 7-pin of N7（TL064）to output 0.00mV. Zero-point adjustment of other channels is alike.

5.3 Warranty Policy

Thank you for choosing ART. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully.

1. Before using ART's products please read the user manual and follow the instructions exactly. When sending in damaged products for repair, please attach an RMA application form which can be downloaded from: www.art-control.com.

2. All ART products come with a limited two-year warranty:

- The warranty period starts on the day the product is shipped from ART's factory
- For products containing storage devices (hard drives, flash cards, etc.), please back up your data before sending them for repair. ART is not responsible for any loss of data.
- Please ensure the use of properly licensed software with our systems. ART does not condone the use of pirated software and will not service systems using such software. ART will not be held legally responsible for products shipped with unlicensed software installed by the user.

3. Our repair service is not covered by ART's guarantee in the following situations:
- Damage caused by not following instructions in the User's Manual.
- Damage caused by carelessness on the user's part during product transportation.
- Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals).
- Damage from improper repair by unauthorized ART technicians.
- Products with altered and/or damaged serial numbers are not entitled to our service.

4. Customers are responsible for shipping costs to transport damaged products to our company or sales office.
5. To ensure the speed and quality of product repair, please download an RMA application form from our company website.

Products Rapid Installation and Self-check

Rapid Installation

Product-driven procedure is the operating system adaptive installation mode. After inserting the disc, you can select the appropriate board type on the pop-up interface, click the button【driver installation】; or select CD-ROM drive in Resource Explorer, locate the product catalog and enter into the APP folder, and implement Setup.exe file. After the installation, pop-up CD-ROM, shut off your computer, insert the USB card. If it is a USB product, it can be directly inserted into the device. When the system prompts that it finds a new hardware, you do not specify a drive path, the operating system can automatically look up it from the system directory, and then you can complete the installation.

Self-check

At this moment, there should be installation information of the installed device in the Device Manager (when the device does not work, you can check this item.). Open "Start -> Programs -> ART Demonstration Monitoring and Control System -> Corresponding Board -> Advanced Testing Presentation System", the program is a standard testing procedure. Based on the specification of Pin definition, connect the signal acquisition data and test whether AD is normal or not. Connect the input pins to the corresponding output pins and use the testing procedure to test whether the switch is normal or not.

Delete Wrong Installation

When you select the wrong drive, or viruses lead to driver error, you can carry out the following operations: In Resource Explorer, open CD-ROM drive, run Others-> SUPPORT-> USB.bat procedures, and delete the hardware information that relevant to our boards, and then carry out the process of section I all over again, we can complete the new installation.